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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/734,078
Filing Date: December 11, 2003
Appellant(s): MURPHY, KENNETH S.

Edward J. Timmer
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 22 May 2008 appealing from the Office action mailed 3 July 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The copy of the appealed claims contained in the Appendix to the brief is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

JP 2000-042755	Nishihata et al.	02-2000
US 5,989,733	Warnes et al.	11-1999
US 4,116,723	Gell et al.	09-1978
US 3,832,167	Shaw et al.	08-1974
US 6,551,423	Spitsberg et al.	04-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishihata et al. (JP 2000-042755) in view of Warnes et al. (US 5,989,733).

In regards to claim 11, Nishihata et al. (JP '755) discloses a nickel-base alloy that would be used as an insertion metal for piping, a thick board, a thin board, a forge article, etc.[0017-0019]. Nishihata et al. (JP '755) further discloses that the alloy would suitable for high temperature applications [0030]. The table on the following page provides a comparison of the alloy composition disclosed by Nishihata et al. (JP '755) with that of the instant invention.

Element	From Instant Claims (weight percent)	Nishihata et al. (JP '755) (weight percent)	Overlap (weight percent)
Cr	about 3 – about 12	1 – 18	about 3 – about 12
Co	0 – about 12	0	0
Mo	0 – about 3	0 – 6	0 – about 3
W	about 3 – about 10	0 – 12	about 3 – about 10
Re	0 – about 6	0	0
Al	about 5 – about 7	1.5 – 15	about 5 – about 7
Ti	0 – about 2	0 – 1	0 – 1
Fe	0 – about 1	0 – 5	0 – about 1
Nb	0 – about 2	0 – 5.5	0 – about 2
Ta	about 3 – about 12	0 – 11	about 3 – 11
C	0 – about 0.07	0 – 0.1	0 – about 0.07
Hf	about 0.030 – about 0.80	0 – 1	about 0.030 – about 0.80
B	0 – about 0.02	0 – 0.05	0 – about 0.02
Zr	0 – 0.10	0 – 0.50	0 – 0.10
Ce	0 – about 0.05	0 – 0.25	0 – about 0.05
Ni	Balance	Balance	Balance

Nishihata et al. (JP '755) discloses a nickel-base alloy as shown above, but Nishihata et al. (JP '755) does not specify an outwardly grown aluminide bondcoat and a ceramic thermal barrier coating disposed on the bondcoat wherein the life of the ceramic thermal barrier during cyclic oxidation would be prolonged.

Warnes et al. ('733) discloses coating a nickel-based alloy with a ceramic thermal barrer over an outwardly grown platinum aluminide bondcoat (abstract, Fig. 5, col. 2, lines 26-55 and col. 9, lines 38-61). Coating a nickel-based alloy with a ceramic thermal barrier over an outwardly grown platinum aluminide bondcoat would provide higher resistance during high temperature oxidation (Fig. 1 and col. 4, lines 39-68).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a ceramic thermal barrier over a platinum aluminide bondocat, as disclosed by Warnes et al. ('733), to the nickel based alloy, as

disclosed by Nishihata et al. (JP '755), in order to improve the oxidation resistance during exposure to high temperatures, as disclosed by Warnes et al. ('733) (Fig. 1 and col. 4, lines 39-68).

Still regarding claim 11, the Examiner notes that the composition disclosed by Nishihata et al. (JP '755) overlaps the composition of the instant invention which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed amounts of chromium, molybdenum, tungsten, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, boron, zirconium, and cerium from the amounts disclosed by Nishihata et al. (JP '755) because Nishihata et al. (JP '755) discloses the same utility (nickel-base alloys) throughout the disclosed ranges.

In regards to claims 12-13, Nishihata et al. (JP '755) discloses that the nickel-base alloy would contain 0 to 0.25 weight percent yttrium (Y) [0018].

In regards to claim 14, Nishihata et al. (JP '755) does not necessitate the addition of sulfur and therefore meets the limitation of "having a sulfur concentration of 2 ppm by weight or less."

In regards to claim 15, Nishihata et al. (JP '755) discloses 0 to 1 weight percent hafnium [0018], which reads on "wherein the Hf concentration of the substrate is from about 0.33% to about 0.80% by weight." as instantly claimed.

In regards to claim 16, Nishihata et al. (JP '755) discloses that the outwardly grown platinum aluminide coating would be single phase (abstract and col. 5, lines 30-45).

Claims 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gell et al. (US 4,116,723) in view of Warnes et al. (US 5,989,733).

In regards to claim 11, Gell et al. ('723) discloses a nickel-base superalloy (col. 4, line 53 - col. 5, line 6). The table below provides a comparison of the alloy composition disclosed by Gell et al. ('723) with that of the instant invention.

Element	From Instant Claims (weight percent)	Gell et al. ('723) (weight percent)	Overlap (weight percent)
Cr	about 3 – about 12	5 – 18	5 – about 12
Co	0 – about 12	0	0
Mo	0 – about 3	0 – 10	0 – about 3
W	about 3 – about 10	0 – 15	about 3 – about 10
Re	0 – about 6	0 – 7	0 – about 6
Al	about 5 – about 7	2 – 8	about 5 – about 7
Ti	0 – about 2	1 – 5	1 – about 2
Fe	0 – about 1	0	0
Nb	0 – about 2	0 – 3	0 – about 2
Ta	about 3 – about 12	0 – 12	about 3 – 12
C	0 – about 0.07	0 – 50 ppm	0 – 50 ppm
Hf	about 0.030 – about 0.80	0 – 3.5	about 0.030 – about 0.80
B	0 – about 0.02	0 – 50 ppm	0 – 50 ppm
Zr	0 – 0.10	0 – 50 ppm	0 – 50 ppm
REM	0 – about 0.05	0	0
Ni	Balance	Balance	Balance

*REM = rare earth element

Still regarding claim 11, the Examiner notes that the claim language "up to" would not necessitate the presence of an element because "up to" would include 0 weight percent. Therefore, cobalt, molybdenum, rhenium, titanium, niobium, carbon, zirconium, boron, and a rare earth element has not been deemed essential to the composition of the nickel-base superalloy according to claim 11.

Gell et al. ('723) discloses a nickel-base superalloy as shown above, but Gell et al. ('723) does not specify that the alloy would include an outwardly grown aluminide

bondcoat and a ceramic thermal barrier coating disposed on the bondcoat wherein the life of the ceramic thermal barrier coating during cyclic oxidation would be prolonged.

Warnes et al. ('733) discloses coating a nickel-based superalloy with a ceramic thermal barrier over an outwardly grown platinum aluminide bondcoat (col. 2, lines 26-55). A nickel-based alloy with a ceramic thermal barrier over an outwardly grown platinum aluminide bondcoat would have higher oxidation resistance during exposure to high temperatures (Fig. 1, col. 2, lines 26-55, and col. 4, lines 39-68).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a ceramic thermal barrier over a platinum aluminide bondocat, as disclosed by Warnes et al. ('733), to the nickel-based superalloy, as disclosed by Gell et al. ('733), in order to improve the oxidation resistance during exposure to high temperatures, as disclosed by Warnes et al. ('733) (Fig. 1, col. 2, lines 26-55, and col. 4, lines 39-68).

Still regarding claim 11, the Examiner notes that the composition disclosed by Gell et al. (JP '755) overlaps the composition of the instant invention which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed amounts of chromium, molybdenum, tungsten, rhenium, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, boron, and zirconium from the amounts disclosed by Gell et al. (JP '755) because Gell et al. (JP '755) discloses the same utility (nickel-base alloys) throughout the disclosed ranges.

In regards to claim 17, Gell et al. ('733) discloses that the nickel-base superalloy

would be used as a gas turbine blade (col. 4, lines 25-33).

Claims 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. (US 3,832,167) in view of Warnes et al. (US 5,989,733).

In regards to claim 11, Shaw et al. ('167) discloses a nickel-base superalloy (col. 1, line 48 – col. 2, line 15). The table below compares the superalloy composition of Shaw et al. ('167) with that of the instant invention.

Element	**From Instant Claims (weight percent)**	**Shaw et al. ('167) (weight percent)**	**Overlap (weight percent)**
Cr	about 3 – about 12	5 – 13	5 – about 12
Co	0 – about 12	0 – 20	0 – about 12
Mo	0 – about 3	1 – 7	1 – about 3
W	about 3 – about 10	0 – 12	about 3 – 12
Re	0 – about 6	0	0
Al	about 5 – about 7	4.5 – 7	about 5 – 7
Ti	0 – about 2	0 – 5	0 – about 2
Fe	0 – about 1	0 – 3	0 – about 1
Nb	0 – about 2	0 – 4	0 – about 2
Ta	about 3 – about 12	0 – 5	about 3 – 5
C	0 – about 0.07	0.03 – 0.2	0.03 – 0.07
Hf	about 0.030 – about 0.80	0.3 – 1.5	0.30 – about 0.80
B	0 – about 0.02	0.001 – 0.01	0.001 – 0.01
Zr	0 – 0.10	0.02 – 0.2	0.02 – 0.10
Y	0 – about 0.05	0.008 – 0.08	0.008 – about 0.05
Ni	Balance	Balance	Balance

Still regarding claim 11, the Examiner notes that the claim language "up to" would not necessitate the presence of an element because "up to" would include 0 weight percent. Therefore, cobalt, molybdenum, rhenium, titanium, niobium, carbon, zirconium, boron, and a rare earth element has not been deemed essential to the composition of the nickel-base superalloy according to claim 11.

Shaw et al. ('167) discloses a nickel-base superalloy as shown above, but Shaw

et al. ('167) does not specify that the alloy would include an outwardly grown aluminide bondcoat and a ceramic thermal barrier coating disposed on the bondcoat wherein the life of the ceramic thermal barrier coating during cyclic oxidation would be prolonged.

Warnes et al. ('733) discloses coating a nickel-based superalloy with a ceramic thermal barrier over an outwardly grown platinum aluminide bondcoat (col. 2, lines 26-55). A nickel-based alloy with a ceramic thermal barrier over an outwardly grown platinum aluminide bondcoat would have higher oxidation resistance during exposure to high temperatures (Fig. 1, col. 2, lines 26-55, and col. 4, lines 39-68).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a ceramic thermal barrier over a platinum aluminide bondocat, as disclosed by Warnes et al. ('733), to the nickel-based superalloy, as disclosed by Shaw et al. ('167), in order to improve the oxidation resistance during exposure to high temperatures, as disclosed by Warnes et al. ('733) (Fig. 1, col. 2, lines 26-55, and col. 4, lines 39-68).

Still regarding claim 11, the Examiner notes that the composition disclosed by Shaw et al. ('167) overlaps the composition of the instant invention which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed amounts of chromium, cobalt, molybdenum, tungsten, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, boron, zirconium and yttrium from the amounts disclosed by Shaw et al. ('167) because Shaw et al. ('167) discloses the same utility (nickel-base alloys) throughout the disclosed ranges.

In regards to claim 17, Shaw et al. ('167) discloses that the nickel-base superalloy would be used as a turbine engine blade (col. 1, lines 23-40).

Claims 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gell et al. (US 4,116,723) in view of Spitsberg et al. (US 6,551,423).

In regards to claim 11, Gell et al. ('723) discloses a nickel-base superalloy (col. 4, line 53 - col. 5, line 6). The table below provides a comparison of the alloy composition disclosed by Gell et al. ('723) with that of the instant invention.

Element	From Instant Claims (weight percent)	Gell et al. ('723) (weight percent)	Overlap (weight percent)
Cr	about 3 – about 12	5 – 18	5 – about 12
Co	0 – about 12	0	0
Mo	0 – about 3	0 – 10	0 – about 3
W	about 3 – about 10	0 – 15	about 3 – about 10
Re	0 – about 6	0 – 7	0 – about 6
Al	about 5 – about 7	2 – 8	about 5 – about 7
Ti	0 – about 2	1 – 5	1 – about 2
Fe	0 – about 1	0	0
Nb	0 – about 2	0 – 3	0 – about 2
Ta	about 3 – about 12	0 – 12	about 3 – 12
C	0 – about 0.07	0 – 50 ppm	0 – 50 ppm
Hf	about 0.030 – about 0.80	0 – 3.5	about 0.030 – about 0.80
B	0 – about 0.02	0 – 50 ppm	0 – 50 ppm
Zr	0 – 0.10	0 – 50 ppm	0 – 50 ppm
REM	0 – about 0.05	0	0
Ni	Balance	Balance	Balance

*REM = rare earth element

Still regarding claim 11, the Examiner notes that the claim language "up to" would not necessitate the presence of an element because "up to" would include 0 weight percent. Therefore, cobalt, molybdenum, rhenium, titanium, niobium, carbon, zirconium, boron, and a rare earth element has not been deemed essential to the composition of the nickel-base superalloy according to claim 11.

Gell et al. ('723) discloses a nickel-base superalloy as shown above, but Gell et al. ('723) does not specify that the alloy would include an outwardly grown aluminide bondcoat and a ceramic thermal barrier coating disposed on the bondcoat wherein the life of the ceramic thermal barrier coating during cyclic oxidation would be prolonged.

Spitsberg et al. ('423) discloses that the deposition of a platinum aluminide layer with an aluminum oxide layer above the platinum aluminide layer on nickel-base superalloys such as Rene N5™ (col. 3, line 62 – col. 4, line 43). This coating system would be used to protect the nickel-base superalloy substrate during thermal cycling thereby prolonging spallation life (col. 3, line 62 - col. 4, line 43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a platinum aluminide layer with an aluminum oxide layer above the platinum aluminide layer, as disclosed by Spitsberg et al. ('423), to the nickel-base superalloy, as disclosed by Gell et al. ('723), in order to protect the nickel-base superalloy during thermal cycling, as disclosed by Spitsberg et al. ('423 (col. 3, line 62 - col. 4, line 43).

Still regarding claim 11, the Examiner notes that the composition disclosed by Gell et al. (JP '755) overlaps the composition of the instant invention which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed amounts of chromium, molybdenum, tungsten, rhenium, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, boron, and zirconium from the amounts disclosed

by Gell et al. (JP '755) because Gell et al. (JP '755) discloses the same utility (nickel-base alloys) throughout the disclosed ranges.

In regards to claim 17, Gell et al. ('733) discloses that the nickel-base superalloy would be used as a gas turbine blade (col. 4, lines 25-33). Spitsberg et al. ('423) discloses that the coating system would be applied to a turbine blade (col. 3, lines 49-61).

Claims 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. (US 3,832,167) in view of Spitsberg et al. (US 6,551,423).

In regards to claim 11, Shaw et al. ('167) discloses a nickel-base superalloy (col. 1, line 48 – col. 2, line 15). The table below compares the superalloy composition of Shaw et al. ('167) with that of the instant invention.

Element	From Instant Claims (weight percent)	Shaw et al. ('167) (weight percent)	Overlap (weight percent)
Cr	about 3 – about 12	5 – 13	5 – about 12
Co	0 – about 12	0 – 20	0 – about 12
Mo	0 – about 3	1 – 7	1 – about 3
W	about 3 – about 10	0 – 12	about 3 – 12
Re	0 – about 6	0	0
Al	about 5 – about 7	4.5 – 7	about 5 – 7
Ti	0 – about 2	0 – 5	0 – about 2
Fe	0 – about 1	0 – 3	0 – about 1
Nb	0 – about 2	0 – 4	0 – about 2
Ta	about 3 – about 12	0 – 5	about 3 – 5
C	0 – about 0.07	0.03 – 0.2	0.03 – 0.07
Hf	about 0.030 – about 0.80	0.3 – 1.5	0.30 – about 0.80
B	0 – about 0.02	0.001 – 0.01	0.001 – 0.01
Zr	0 – 0.10	0.02 – 0.2	0.02 – 0.10
Y	0 – about 0.05	0.008 – 0.08	0.008 – about 0.05
Ni	Balance	Balance	Balance

Still regarding claim 11, the Examiner notes that the claim language "up to" would not necessitate the presence of an element because "up to" would include 0 weight

percent. Therefore, cobalt, molybdenum, rhenium, titanium, niobium, carbon, zirconium, boron, and a rare earth element has not been deemed essential to the composition of the nickel-base superalloy according to claim 11.

Shaw et al. ('167) discloses a nickel-base superalloy as shown above, but Shaw et al. ('167) does not specify that the alloy would include an outwardly grown aluminide bondcoat and a ceramic thermal barrier coating disposed on the bondcoat wherein the life of the ceramic thermal barrier coating during cyclic oxidation would be prolonged.

Spitsberg et al. ('423) discloses that the deposition of a platinum aluminide layer with an aluminum oxide layer above the platinum aluminide layer on nickel-base superalloys such as Rene N5^{TM} (col. 3, line 62 – col. 4, line 43). This coating system would be used to protect the nickel-base superalloy substrate during thermal cycling thereby prolonging spallation life (col. 3, line 62 - col. 4, line 43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a platinum aluminide layer with an aluminum oxide layer above the platinum aluminide layer, as disclosed by Spitsberg et al. ('423), to the nickel-base superalloy, as disclosed by Shaw et al. ('167), in order to protect the nickel-base superalloy during thermal cycling, as disclosed by Spitsberg et al. ('423 (col. 3, line 62 - col. 4, line 43).

In regards to claim 17, Shaw et al. ('167) discloses that the nickel-base superalloy would be used as a turbine engine blade (col. 1, lines 23-40). Spitsberg et al. ('423) discloses that the coating system would be applied to a turbine blade (col. 3, lines 49-61).

(10) Response to Argument

First, the Appellant primarily argues that Figures 3, 4 and 5 in addition to the specification at pages 8-10 illustrate the significant and unexpected prolongation of spallation life of the ceramic thermal barrier coating achieved when the ceramic thermal barrier is disposed on the recited outwardly grown diffusion aluminide bondcoat on the recited superalloy substrate composition (see pages 9-11, 15-17, 19-21, 23-28 and 27-29 of the Appeal Brief filed 22 May 2008).

In response, the Examiner notes that Figures 3-4 teach that increasing the amount of hafnium in nickel base superalloys having a ceramic thermal barrier disposed on an outwardly grown diffusion aluminide bondcoat from 900 ppm (0.09%) to 5933 ppm (0.5933%) in the presence of no yttrium would result in a significant prolongation of spallation life of the ceramic thermal barrier coating achieved when the ceramic thermal barrier is disposed on an outwardly grown diffusion aluminide bondcoat and Figure 5 teaches that a nickel-base superalloy having 3333 ppm (0.3333%) hafnium and 60 ppm (0.006%) yttrium would have a higher spallation life than a nickel-base superalloy having 4933 ppm (0.4933%) hafnium and 61 ppm (0.0061%) yttrium. The Examiner further notes that lines 7-8 of claim 11 recite "up to about 0.050% of a rare earth element" whereas the Appellant's specification only provides results for nickel-base superalloys having yttrium (and a lack thereof). Objective evidence of nonobviousness must be commensurate in scope with claims that evidence is offered to support. MPEP 2145, especially Grasselli, 713 F.2d at 743, 218 USPQ at 778 and In re Lindner, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972). Furthermore, the Appellant has failed

to provide the resulting spallation lifetimes of nickel-base superalloys having hafnium and other rare earth elements, such as cerium, neodymium, and ytterbium and it cannot be assumed that each and every one of the rare elements in combination with hafnium would necessarily react the same as yttrium and hafnium relative to the spallation life based upon Figures 3-5 and pages 8-10 of the Appellant's specification.

Second, the Appellant primarily argues that the alloy composition of Nishihata et al. (JP '755) would be a welded alloy for high pressure piping and is designed to meet certain welding requirements and the Appellant's claims involve a coated article having a thermal barrier coating system (see page 10 of the Appeal Brief filed 22 May 2008).

In response, the Examiner notes that "A coated article" would not preclude the material from being a weld material as described by Nishihata et al. (JP '755) [0017-0019].

Third, the Appellant primarily argues that the chromium range (1-18%) and aluminum range (1.5-15%) of Nishihata et al. (JP '755) are so much broader than the chromium and aluminum ranges of the Appellant's as to be utterly non-suggestive with respect to Appellant's claim 11 (see page 10 of the Appeal Brief filed 22 May 2008).

In response, to establish unexpected results over a claimed range, the Appellant should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. MPEP 716.02 (d)(II). Because the Appellant has failed to show the criticality of the ranges of chromium and aluminum with respect to the resistance to cyclic oxidation or the improvement of any other property of the nickel-base superalloy, this argument is unpersuasive.

Fourth, the Appellant primarily argues that given that the alloy disclosed by Nishihata et al. (JP '755) is a welded alloy for high pressure piping, there can be no suggestion whatsoever in Nishihata et al. (JP '755) that Appellant's recited superalloy composition including hafnium in the recited range when provided with an outwardly grown diffusion aluminide coating and ceramic thermal barrier coating exhibits a significant and unexpected prolongation of spallation life of the ceramic thermal barrier coating as demonstrated by Appellant's Figures 3, 4, and 5 and specification pages 8-10 (see pages 10-11 of the Appeal Brief filed 22 May 2008).

In response to the Appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 11981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Further, the Examiner notes that in paragraph 4 of page 4 of the instant specification, "A specimen was considered failed in the cyclic oxidation testing when the specimen lost 5 mg/cm^2 in weight.". In comparing Figures 1 and 2 of the instant specification with that of Figure 1 of Warnes et al. ('733), wherein the cyclic oxidation testing takes place at substantially similar conditions, the Examiner notes that the weight change in Figure 1 of Warnes et al.('755) never falls below 2 mg/cm^2 and according to the standard as stated in paragraph 4 of page 4 of the instant specification, the outwardly grown diffusion aluminide of Warnes et al. ('733) does not fail in oxidation testing and thus the Appellant has not established unexpected results with respect to the prolongation of spallation life.

Fifth, the Appellant primarily argues that there is no motivation whatsoever in the references themselves to combine the Warnes et al. ('733) patent with the Nishihata et al. (JP '755) patent, except by a prohibited hindsight analysis of the Appellant's claims (see page 11 of the Appeal Brief filed 22 May 2008).

In response to the Appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Sixth, the Appellant primarily argues that claim 15 recites a hafnium content of about 0.33% to about 0.80% by weight of the substrate; the cited references do not suggest or render obvious the coated article of claim 15 having a hafnium content controlled in the recited range together with other alloying elements of the substrate and together with the presence of the recited outwardly grown diffusion aluminide coating and thermal barrier coating to unexpectedly prolong the spallation life of the thermal barrier coating as demonstrated by Appellant's Figures 3, 4 and 5 and specification pages 8-10 (see page 14 of the Appeal Brief filed 22 May 2008).

In response, the Examiner notes that Figures 3-4 teach that increasing the amount of hafnium in nickel base superalloys having a ceramic thermal barrier disposed

on an outwardly grown diffusion aluminide bondcoat from 900 ppm (0.09%) to 5933 ppm (0.5933%) in the presence of no yttrium would result in a significant prolongation of spallation life of the ceramic thermal barrier coating achieved when the ceramic thermal barrier is disposed on an outwardly grown diffusion aluminide bondcoat and Figure 5 teaches that a nickel-base superalloy having 3333 ppm (0.3333%) hafnium and 60 ppm (0.006%) yttrium would have a higher spallation life than a nickel-base superalloy having 4933 ppm (0.4933%) hafnium and 61 ppm (0.0061%) yttrium. The Examiner further notes that lines 7-8 of claim 11 recite "up to about 0.050% of a rare earth element" whereas the Appellant's specification only provides results for nickel-base superalloys having yttrium (and a lack thereof). Objective evidence of nonobviousness must be commensurate in scope with claims that evidence is offered to support. MPEP 2145, especially Grasselli, 713 F.2d at 743, 218 USPQ at 778 and In re Lindner, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972). Furthermore, with respect to the recitation "wherein the Hf concentration of the substrate is from about 0.33 to about 0.80% by weight.", the Examiner notes that to establish unexpected results, the Appellant should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. MPEP 716.02 (d)(II). Furthermore, the Appellant has failed to provide resulting spallation lifetimes of nickel-base superalloys having hafnium in combination with any of the other rare earth elements, such as cerium, neodymium, and ytterbium and it cannot be assumed that each and every rare earth element in combination with hafnium would necessarily react the same as yttrium and hafnium relative to the spallation life based upon Figures 3-5

and pages 8-10 of the Appellant's specification.

Seventh, the Appellant primarily argues that in making the obviousness rejection, the Examiner compares alloy compositions on page 2 of the Office Action of 3 July 2007. However, the tungsten range (0-15%), tantalum range (0-12%) and hafnium range (0-3.5%) of the Gell et al. ('723) patent, which would be directed to nickel-base superalloy would be used as a gas turbine blade (col. 4, lines 25-33),.are so much broader than the corresponding ranges disclosed by the Appellant that they would be utterly non-suggestive with respect to Appellant's claim 11 (see page 16 of the Appeal Brief filed 22 May 2008).

In response, to establish unexpected results over a claimed range, the Appellant should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. MPEP 716.02 (d)(II). Because the Appellant has failed to show the criticality of the ranges of tungsten, tantalum, and hafnium with respect to the resistance to cyclic oxidation or the improvement of any other property of the nickel-base superalloy, this argument is unpersuasive. The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages. MPEP 2144.05 II.

Eighth, the Appellant primarily argues that there is no motivation whatsoever in the references themselves to combine the Warnes et al. ('733) patent with the Gell et al. ('723) patent, except by a prohibited hindsight analysis of the Appellant's claims (see page 17 of the Appeal Brief filed 22 May 2008).

In response to the Appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Ninth, the Appellant primarily argues that two technical articles supplied by the Appellant rebut the current obviousness rejection of claims 11 and 17 (see pages 13, 18, 22, 26, and 30 of the Appeal Brief filed 22 May 2008).

In response, the articles provided by the Appellant do not provide evidence that each and every rare earth element present within the claimed range would have equivalent properties in the presence of hafnium, and Clark and Levi (Material Design For The Next Generation Thermal Barrier Coatings) discloses (page 412) that "One would then anticipate that Gd, Sm, and La should be more reactive than Y" and thus would conclude that the other rare earth elements in alone or in combination with other elements of a nickel-base superalloy would not necessarily react the same as Y.

Tenth, the Appellant primarily argues that the tungsten range (0-15%), tantalum range (0-12%), and the hafnium range (0-3.5%) of Gell et al. ('723) are so much broader than the corresponding ranges of the Appellant's as to be utterly non-suggestive with respect to Appellant's claim 11 (see pages 16 and 24 of the Appeal

Brief filed 22 May 2008).

In response, to establish unexpected results over a claimed range, the Appellant should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. MPEP 716.02(d)(II). Because the Appellant has failed to show the criticality of the ranges of tungsten, tantalum, and hafnium with respect to the resistance to cyclic oxidation or the improvement of any other property of the nickel-base superalloy, this argument is unpersuasive.

Eleventh, the Appellant primarily argues that the chromium range (2-20%), tungsten range (0-20%), tantalum range (0-9%), and the hafnium range (0.25-3%) of of Shaw et al. ('167) are so much broader than the corresponding ranges of the Appellant's as to be utterly non-suggestive with respect to the Appellant's claim 11 (see pages 20 and 28 of the Appeal Brief filed 22 May 2008).

In response, to establish unexpected results over a claimed range, the Appellant should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. MPEP 716.02 (d)(II). Because the Appellant has failed to show the criticality of the ranges of chromium, tungsten, tantalum, and hafnium with respect to the resistance to cyclic oxidation or the improvement of any other property of the nickel-base superalloy, this argument is unpersuasive.

Twelfth, the Appellant primarily argues that there is no motivation whatsoever in the references themselves to combine the Warnes et al. ('733) patent with the Shaw et al. ('167) patent, except by a prohibited hindsight analysis of the Appellant's claims (see page 21 of the Appeal Brief filed 22 May 2008).

In response to the Appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Thirteenth, the Appellant primarily argues that there is no motivation whatsoever in the references themselves to combine the Spitsberg et al. ('423) patent with the Gell et al. ('723) patent, except by a prohibited hindsight analysis of the Appellant's claims (see page 25 of the Appeal Brief filed 22 May 2008).

In response to the Appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Fourteenth, the Appellant primarily argues that there is no motivation whatsoever in the references themselves to combine the Spitsberg et al. ('423) patent with the Shaw

et al. ('167) patent, except by a prohibited hindsight analysis of the Appellant's claims (see page 25 of the Appeal Brief filed 22 May 2008).

In response to the Appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Jessee Roe/

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/Gregory L Mills/

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